

## CURRICULUM VITAE

**NAME:** Tomasz Heyduk

**HOME ADDRESS:** 2510 Johnson Place Dr., Ballwin, MO 63021

**BIRTH DATE:** December 29, 1956

**EDUCATION:**

<u>Institution</u>	<u>Date</u>	<u>Major</u>	<u>Degree</u>
University of Wroclaw Wroclaw, Poland	1979	Chemical Sciences	M.Sc.
Technical University of Wroclaw Wroclaw, Poland	1986	Chemistry	Ph.D.

**CURRENT POSITION AND ADDRESS:**

Professor  
Department of Biochemistry and Molecular Biology  
St. Louis University School of Medicine  
1402 South Grand Boulevard  
St. Louis, MO 63104

**PREVIOUS PROFESSIONAL EXPERIENCE:**

1980-1986	Graduate Student and Teaching Assistant, Technical University of Wroclaw, Poland.
1986-1987	Research Associate, Technical University of Wroclaw, Poland.
1987-1989	Postdoctoral Fellow, St. Louis University School of Medicine, Department of Biochemistry and Molecular Biology, St. Louis, MO.
1989-1991	Research Assistant Professor, Dept. of Biochemistry and Molecular Biology, St. Louis University School of Medicine, St. Louis, MO..
1991-1992	Research Assistant Professor, The University of Texas, Medical Branch, Galveston, TX.
1992-1998	Assistant Professor, Dept. of Biochemistry and Molecular Biology, St. Louis University School of Medicine, St. Louis, MO.
1998-2003	Associate Professor, Dept. of Biochemistry and Molecular Biology, St. Louis University School of Medicine, St. Louis, MO.
2003-present	Professor, Dept. of Biochemistry and Molecular Biology, St. Louis University School of Medicine, St. Louis, MO.
2007-present	Associate Director for Basic Science, Saint Louis University Cancer Center

**PROFESSIONAL SOCIETY MEMBERSHIPS:**

Biophysical Society, ASMB

## **HONORARY SOCIETIES, HONORS AND AWARDS:**

Polish Ministry of Higher Education. Outstanding Ph.D. dissertation in 1986  
Outstanding Faculty/Mentor (Graduate Student Association), 1996

## **PROFESSIONAL SERVICES:**

Ad hoc reviewer for:

*Analytical Chemistry*  
*Analytical Biochemistry*  
*Biochemistry*  
*Biophysical Chemistry*  
*Biophysical Journal*  
*Bioconjugate Chemistry*  
*BioTechniques*  
*Combinatorial Chemistry and High Throughput Screening*  
*Chem Biochem*  
*Journal of American Chemical Society*  
*Journal of Biological Chemistry*  
*Journal of Molecular Biology*  
*Journal of Fluorescence*  
*Molecular and Cellular Biology*  
*Nature Methods*  
*Nature Structural and Molecular Biology*  
*Nature*

Gibbs Conference, co-organizer (1991)

Gibbs Conference, treasurer (1992-2001)

Ad hoc reviewer for NSF grant applications

Ad hoc member of American Cancer Society Advisory Committee on Personnel for Research - A (1994)

Ad hoc member of NIH NIAID Special Emphasis Panel "Innovation Grant Program for Approaches in HIV Vaccine Research" (June 1998).

Ad hoc member of NIH BBCA study section, June 1999.

NIH Special Emphasis Panel and Project Site Visit to the Fluorescence Dynamics Resource, Urbana, IL (2000)

Permanent member of NIH BBCA study section (October 2002 - October 2004).

Permanent member of NIH MSFC study section (February 2004 - October 2007).

## **RESEARCH SUPPORT:**

### **Ongoing Research Support**

RO1 GM 50514 Heyduk (PI) 08/01/03-07/31/09

No cost extension

NIH/NIGMS

Inter and intramolecular communications in transcription.

The major goal of this project is to understand the role of s<sup>70</sup> subunit of RNA polymerase in transcription initiation.

Role: PI

R41HG003964 Heyduk (PI)	09/19/06-08/31/09
No cost extension	
NIH/NHGRI	
Microarrays for DNA binding proteins	
The goal of this project is to develop highly multiplexed microarrays for detecting sequence-specific DNA binding proteins.	
Role:PI	
AHA Heyduk(PI)	01/01/07-
12/31/08	
Enhanced affinity bivalent ligands and inhibitors	
The major goal of this project is to develop bivalent enhanced affinity ligands for thrombin.	
Role: PI	
R41 GM079891 Heyduk (PI)	03/01/2007-02/28/2009
No cost extension	
NIH/NIGMS	
Rapid homogeneous antibody-based detection of proteins	
The major goal of this project is to develop antibody-based homogenous molecular pincer assay for detecting proteins.	
Role: PI	
JDRF                          Heyduk (PI)	04/01/2007 –
3/31/2009	
No cost extension	
New methodologies for real time assessment of beta-cell function	
The major goal of this proposal is to develop new assay for rapid determination of insulin and C-peptide	
Role: PI	
<b><u>Pending</u></b>	
R42 GM079891 Heyduk (PI)	07/01/2008-
06/30/2010	
NIH/GM	
Rapid homogeneous antibody-based detection of proteins	
The major goal of this project is to develop antibody-based homogenous molecular pincer assay for detecting proteins. This is Phase II STTR proposal.	
Role: PI	
R41 AI081381 Heyduk, T. (PI)	11/01/2008-
10/30/2010	
Title: Rapid sensing of pathogenic bacteria	
Project goals: The goal of this project will to develop sensors for rapid detection of pathogenic bacteria and viruses.	
Role: PI	
R21 CA137705 Heyduk, T. (PI)	09/01/2008-
08/30/2011	

Title: Protein microarrays that do not require protein spotting

Project goals: The goal of this project will be to develop a new design of protein microarrays.

Role: PI

## PUBLICATIONS

1. Jedrzejak, J. **Heyduk, T.** and Kochman, M. An approach to the elucidation of the quaternary structure role in the activity of pyruvate kinase. Studies on the immobilized enzyme. *Int. J. Biochem.* **15**:695-702, 1983.
2. Dzugaj, A., **Heyduk, T.**, Buczylko, J. and Kochman, M. Structural changes of rabbit liver fructose-1, 6-biphosphatase: The effect of urea and subtilisin digestion. *Arch. Biochem. Biophys.* **239**:486-490, 1985.
3. **Heyduk, T.** and Kochman, M. Temperature-induced conformational transition in rabbit muscle aldolase studied by temperature dependence of sulphydryl reactivity. *Eur. J. Biochem.* **151**:337-343, 1985.
4. **Heyduk, T.** and Kochman, M. Re-evaluation of the role of thiol groups in rabbit muscle aldolase A. *Biochim. Biophys. Acta* **874**:365-367, 1986.
5. **Heyduk, T.** Moniewska, A. and Kochman, M. The reactivity and function of cysteine residues in rabbit liver aldolase B. *Biochim. Biophys. Acta* **874**:337-346, 1986.
6. **Heyduk, T.** and Lee, J.C. *E. coli* cAMP receptor protein: Evidence for three conformational states with different promoter binding affinities. *Biochemistry* **28**:6914-6924, 1989.
7. **Heyduk, T.** and Lee, J.C. Application of fluorescence energy transfer and polarization to monitor *E. coli* cAMP receptor protein and lac promoter interaction. *Proc. Natl. Acad. Sci. USA* **87**:1744-1748, 1990.
8. **Heyduk, T.**, Ryszard Michalczyk and Marian Kochman. Long-range Effects and Conformational Flexibility of Aldolase. *J. of Biol. Chem.* **266**:15650-15655. 1991.
9. Heyduk, E., **Heyduk, T.** and Lee, J.C. Global Conformational Changes in Allosteric Proteins: A Study of *E. Coli* cAMP Receptor Protein and Muscle Pyruvate Kinase. *J. of Biol. Chem.* **267**:3200-3204, 1992
10. Heyduk, E., **Heyduk, T.** and Lee, J.C. Intersubunit Communications in *E. Coli* cAMP Receptor Protein:Studies of the Ligand Binding Domain. *Biochemistry* **31**:3682-3688, 1992.
11. **Heyduk, T.** and Lee, J.C. Solution Studies on the Structure of Bent DNA in the cAMP Receptor Protein-lac DNA Complex. *Biochemistry* **31**:5165-5171, 1992

12. Heyduk, T., Lee, J.C., Ebright, Y.W., Blatter, E., Zhou, Y. and Ebright, R.H. CAP-RNA polymerase interaction in solution in the absence of promoter DNA. *Nature* **364**, 548-549, 1993.
13. Heyduk, E. and Heyduk, T. Physical studies on interaction of transcriptional activator and RNA-polymerase: Fluorescent derivatives of CRP and RNA polymerase. *Cell Molec. Biol. Res.* **39**, 401-407, 1993.
14. Adamus, G., Arendt, A., Hargrave, P. A., Heyduk, T. and Palczewski, K. The Kinetics of Multi-Phosphorylation of Rhodopsin. *Archives of Biochem. Biophys.* **304**:443-447, 1993.
15. Heyduk, T. and Callaci, S. Fluorescence probes for studying the mechanisms of transcription activation. *SPIE Proc.* **2137**:719-724, 1994.
16. Heyduk, E. and Heyduk, T. Mapping protein domains involved in macromolecular interactions: A novel protein footprinting approach. *Biochemistry* **33**:9643-9650, 1994.
17. Heyduk, T., Ma, Y., Tang, H. and Ebright, R.H. Fluorescence anisotropy: rapid, quantitative assay for protein-DNA and protein-protein interaction. *Methods in Enzymol.* **274**:492-502, 1996.
18. Heyduk, T., Heyduk, E., Severinov, K., Tang, H. and Ebright, R.H. Determinants of RNA polymerase $\sigma$  subunit for interaction with  $\beta$ ,  $\beta'$  subunits: Hydroxyl-radical protein footprinting. *Proc. Natl. Acad. Sci. USA* **93**:10162-10166, 1996.
19. Waheed, A., Okuyama, T., Heyduk, T. and Sly, W.S. Carbonic anhydrase IV: Purification of a secretory form of the recombinant human enzyme and identification of the positions and importance of its disulfide bonds. *Arch. Biochem. Biophys.* **333**:432-438, 1996.
20. Niu, W., Kim, Y., Tau, G., Heyduk, T. and Ebright, R. Transcription activation at class II CAP-dependent promoters: a promoter-class-specific activating region and activating target. *Cell* **87**:1123-1134, 1996.
21. Heyduk, E. and Heyduk, T. Thiol reactive luminescence europium chelates. Luminescence probes for resonance energy transfer distance measurements in biomolecules. *Anal. Biochem.* **248**, 216-227, 1997.
22. Baichoo, N. and Heyduk, T. Mapping conformational changes in a protein: application of protein footprinting technique to cAMP-induced conformational changes of cAMP receptor protein (CRP). *Biochemistry* **36**: 10830-10836, 1997.
23. Wang, Y., Severinov, K., Loizos, N., Fenyö, D., Heyduk, E., Heyduk, T., Chait, B.T. and Darst, S. *E. coli* RNA polymerase assembly with the  $\sigma$  subunit. *J. Mol. Biol.* **270**: 648-662, 1997.
24. Heyduk, E., Heyduk, T., Claus, P., and Wisniewski, J.R. Conformational changes of the DNA induced by binding of *Chironomus* high mobility group protein 1a: Regions flanking an HMG-box domain do not influence the bend angle of the DNA. *J. Biol. Chem.* **272**: 19763-19770, 1997.

25. Callaci, S., and **Heyduk, T.** Conformation and DNA Binding Properties of a Single-stranded DNA Binding Region qfs<sup>70</sup> Subunit from *E. coli* RNA Polymerase are Modulated by Interaction with the Core Enzyme. *Biochemistry* **37**: 3312-3320, 1998.

26. Heyduk, E., and **Heyduk, T.** Probing the structure of macromolecules using microsecond time-resolved fluorescence of europium chelates. *SPIE Proc.* **3256**: 218-222, 1998.

27. Callaci, S., Heyduk, E., and **Heyduk, T.** Conformational Changes of *Escherichia coli* RNA polymerase s<sup>70</sup> Factor Induced by Binding to the Core Enzyme. *J. Biol. Chem.* **273**, 329950-33001, 1998.

28. Callaci, S., Heyduk, E., and **Heyduk, T.** Core RNA Polymerase from *E. coli* Induces a Major Change in the Domain Arrangement of the s<sup>70</sup> Subunit. *Mol. Cell* **3**, 229-238, 1999.

29. Heyduk, E., and **Heyduk, T.** Architecture of a complex between s<sup>70</sup> subunit of *E. coli* RNA polymerase and ss nontemplate strand oligonucleotide: luminescence resonance energy transfer study. *J. Biol. Chem.* **274**, 3315-3322, 1999.

30. Baichoo, N., and **Heyduk, T.** Mapping cyclic nucleotide-induced conformational changes in cyclicAMP receptor protein by a protein footprinting technique using different chemical proteases *Protein Science* **8**, 518-528, 1999.

31. Matlock, D. L., and **Heyduk, T.** A Real-Time Fluorescence Method to Monitor the Melting of Duplex DNA During Transcription Initiation by RNA Polymerase. *Anal. Biochem.* **247**, 140-147, 1999.

32. Baichoo, N., and **Heyduk, T.** DNA-induced conformational changes in cyclicAMP receptor protein: detection and mapping by a protein footprinting technique using multiple chemical proteases. *J. Mol. Biol.* **290**, 37-48, 1999.

33. Wisniewski, J.R., Krohn, N.M., Heyduk, E., Grasser, K.D., and **Heyduk, T.** HMG1 proteins from evolutionary distant organisms distort B-DNA conformation in similar way. *Biochem. Biophys. Acta* **1447**, 25-34, 1999.

34. Zhao, T., **Heyduk, T.**, Allis, C. D., and Eissenberg, J. C. Heterochromatin protein 1 (HP1) binds to nucleosomes and DNA *in vitro*. *J. Biol. Chem.* **275**, 28332-28338, 2000.

35. Matlock, D.L., and **Heyduk, T.** Sequence determinants for the recognition of the fork junction DNA containing the -10 region of promoter DNA by *E. coli* RNA polymerase. *Biochemistry* **39**, 12274-12283, 2000.

36. **Heyduk, T.**, and Heyduk, E. Luminescence energy transfer with lanthanide chelates: interpretation of sensitized acceptor decay amplitudes. *Analytical Biochemistry* **289**, 60-67, 2001.

37. Piekielko, A., Drung, A., Rogalla, P., Schwanbeck, R., **Heyduk, T.**, Gerharz, M., Bullerdiek, J., and Wisniewski, J. R. Distinct organization of DNA complexes of various

HMGI/Y family proteins and their modulation upon mitotic phosphorylation. *J. Biol. Chem.* **276**, 1984-1992, 2001.

38. Underwood, M. C., Zhong, D., Mathur, A., **Heyduk, T.**, and Bajaj, S. P. Thermodynamic linkage between the S1 site, Na<sup>+</sup> site and the Ca<sup>2+</sup> site in the protease domain of human coagulation factor Xa: studies on catalytic efficiency and inhibitor binding. *J. Biol. Chem.* **275**, 36876-36884, 2000.

39. **Heyduk, T.**, Baichoo, N., Heyduk, E. Hydroxyl radical footprinting of proteins using metal ion complexes, in "Probing of Proteins by Metal Ions and Their Low-Molecular-Weight Complexes", Vol. 38 of 'Metal Ions in Biological Systems', A. Sigel and H. Sigel, eds.; M. Dekker, Inc., New York, 2001.

40. **Heyduk, T.** Luminescence resonance energy transfer analysis of RNA polymerase complexes. *METHODS: A Companion to Methods in Enzymol.* **25**, 44-53, 2001.

41. Zhao, T., **Heyduk, T.**, and Eissenberg, J.C. Phosphorylation Site Mutations in Heterochromatin Protein 1 (HP1) Reduce or Eliminate Silencing Activity. *J. Biol. Chem.* **276**, 9512-9518, 2001.

42. Young, B.A., Anthony, L.C., Gruber, T.M., Arthur, T.M., Heyduk, E., Lu, C.Z., Sharp, M.M., **Heyduk, T.**, Burgess, R.R., and Gross, C.A. A coiled-coil from the RNA polymerase b' subunit allosterically induces selective nontemplate strand binding by s<sup>70</sup>. *Cell* **105**, 935-944, 2001.

43. Schwanbeck, R., Gymnopoulos, M., Petry, I., Piekielko, A., Szewczuk, Z., **Heyduk, T.**, Zechel, K., and Wisniewski, J.R. Consecutive steps of phosphorylation affect conformation and DNA binding of the cHMGA protein. *J. Biol. Chem.* **28**, 26012-26021, 2001.

44. Heyduk, E., Baichoo, N., and **Heyduk, T.** Interaction of the a-subunit of *E. coli* RNA polymerase with DNA: rigid body nature of the protein-DNA contact. *J. Biol. Chem.* **276**, 44598-44603, 2001.

45. Kuznedelov, K., Minakhin, L., Niedziela-Majka, A., Dove, S.L., Rogulja, D., Nickels, B.E., Hochschild, A., **Heyduk, T.**, and Severinov, K. The RNA polymerase core flap domain triggers conformational switch in the s subunit to allow promoter recognition. *Science* **295**, 855-857, 2002.

46. **Heyduk, T.** and Heyduk, E. Molecular beacons for detecting DNA binding proteins. *Nature Biotechnology*, **20**, 171-176, 2002.

47. Heyduk, E., and **Heyduk, T.** Conformation of fork junction DNA in a complex with *E. coli* RNA polymerase. *Biochemistry*, **41**, 2876-2883, 2002.

48. **Heyduk, T.**, and Niedziela-Majka, A. FRET analysis of *E. coli* RNA polymerase-DNA complexes. *Biopolymers*;61, 201-13,2001-2002.

49. Nechayev, S., Yuzhenkova, Y., Niedziela-Majka, A., **Heyduk, T.**, and Severinov, K. A novel bacteriophage-encoded RNA polymerase binding protein inhibits transcription initiation and abolishes transcription termination by host RNA polymerase. *J. Mol. Biol.* **28**, 11-22, 2002.

50. Heyduk, T. Measuring protein conformational changes by FRET/LRET. *Current Opinions in Biotechnology* **13**, 292-296, 2002.

51. Klein, C., Sunahara, R.K., Hudson, T.Y., Heyduk, T., and Howlett, A.C. Zinc inhibition of cAMP signaling. *J. Biol. Chem.* **277**, 11859-11865, 2002.

52. Bergendahl, V., Anthony, L.C., Heyduk, T., and Burgess, R.R. On-column TCEP reduction and IC5-maleimide labeling during purification of a RpoC-fragment on a Ni-NTA column. *Analyt. Biochem.* **307**, 368, 2002.

53. Heyduk, E., Knoll, E., and Heyduk, T. Molecular beacons for detecting DNA binding proteins: mechanism of action. *Analyt. Biochem.* **316**, 1-10, 2003.

54. Minakhin, L., Niedziela-Majka, A., Kuznedelov, K., Adelman, K., Heyduk, T., and Severinov, K. Interaction of dimeric T4 AsiA with its target sites in the RNA polymerase s<sup>70</sup> subunit leads to distinct and opposite effects on transcription. *J. Mol. Biol.* **326**, 679-690, 2003.

55. Bergendahl, V., Heyduk, T., and Burgess, R. R. Luminescence energy transfer-based high-throughput screening assay for inhibitors of essential protein-protein interactions in bacterial RNA polymerase. *Appl. Environ. Microbiol.* **69**, 1492-1498, 2003.

56. Heyduk, E., Fei, Y., and Heyduk, T. Homogenous fluorescence assay for cAMP. *Combinatorial Chemistry and High-throughput Screening* **6**, 183-194, 2003.

57. Simeonov, M.F., Bieber Urbauer, R.J., Gilmore, J.M., Adelman, K., Brody, E.N., Niedziela-Majka, A., Minakhin, L., Heyduk, T., and Urbauer, J.L. Characterization of the interactions between the bacteriophage T4 AsiA protein and RNA polymerase. *Biochemistry* **42**, 7717-7726, 2003.

58. Borman, L., Schwanbeck, R., Heyduk, T., Seebek, B., Rogalla, P., Bullerdiek, J., and Wisniewski, J.R. High mobility group A2 protein and its derivatives bind a specific region of the promoter of DNA repair gene ERCC1 and modulate its activity. *Nucleic Acids Res.* **31**, 6841-6851, 2003.

59. Knoll, E., and Heyduk, T. Unimolecular beacons for detection of DNA binding proteins. *Analyt. Chem.* **76**, 1156-1164, 2004.

60. Gregory, B.D., Nickels, B.E., Garrity, S.J., Severinova, E., Minakhin, L., Bieber Urbauer, R.J., Urbauer, J.L., Heyduk, T., Severinov, K., and Hochschild, A. A regulator that inhibits transcription by targeting an intersubunit interaction of RNA polymerase holoenzyme. *Proc. Natl. Acad. Sci USA* **101**, 4554-4559, 2004.

61. Klein, C., Heyduk, T., and Sunahara, R. Zinc inhibition of adenylyl cyclase correlates with conformational changes in the enzyme. *Cellular Signalling* **16**, 1177-1185, 2004.

62. Heyduk, E., and Heyduk, T. Nucleic-acid based sensors for proteins. *Analyt. Chem.* **77**, 1147-1156, 2005.

63. Niedziela-Majka, A. and **Heyduk, T.** Escherichia coli RNA polymerase contacts outside the -10 promoter element are not essential for promoter melting. *J. Biol. Chem.* **280**, 38219-38227, 2005.

64. Bera, S., Vora, A.C., Chiu, R., **Heyduk, T.**, and Grandgenett, D.P. Synaptic complex formation of two retrovirus DNA attachment sites by integrase: a fluorescence energy transfer study. *Biochemistry* **44**, 15106-15114, 2005.

65. Semenova, E., Minakhin, L., Bogdanova, E., Nagornykh, M., Vasilov, A., **Heyduk, T.**, Solonin, A., Zakharova, M., and Severinov, K. Transcription regulation of the EcoRV restriction-modification system. *Nucl. Acid. Res.* **33**, 6942-6951, 2005.

66. Heyduk, E., Kuznedelov, K., Severinov, K., and **Heyduk, T.** A consensus adenine at position -11 of the notemplate strand of bacterial promoter is important for nucleation of promoter melting. *J. Biol. Chem.* **281**, 12362-12369, 2006.

67. Feklistov, A., Barinova, N., Sevostyanova, A., Heyduk, E., Bass, I., VVedenskaya, I., Kuznedelov, K., Merkiene, E., Stavrovskaya, E., Klimasauskas, S., Nikiforov, V., **Heyduk, T.**, Severinov, K., and Kulbachinsky, A. A novel basal downstream element recognized by free RNA polymerase s subunit determines promoter recognition by RNA polymerase holoenzyme. *Mol. Cell* **23**, 1-11, 2006.

68. Sevostyanova A, Feklistov A, Barinova N, Heyduk E, Bass I, Klimasauskas S, **Heyduk T**, and Kulbachinskiy A. Specific recognition of the -10 promoter element by the free RNA polymerase sigma subunit. *J. Biol. Chem.* **282**, 22033-22039, 2007.

69. Ekaterina Bogdanova, Marko Djordjevic, **Tomasz Heyduk**, and Konstantin Severinov. Transcription Regulation of the Type II Restriction-Modification System AhdI. *Nucleic Acids Res.*, **36**, 1429, 2008.

70. Heyduk, E., Dummit, B., Chang, Y.C and **Heyduk, T.** Molecular pincers – new antibody-based homogeneous protein sensors. *Anal. Chem.* **80**, 5152-5159, 2008.

71. Tian, L., and **Heyduk, T.** Bivalent ligands with long nanometer-scale flexible linkers. *Biochemistry*, in press, 2009.

#### Patents:

- 1.) U.S. Patent 6,544,746 B2 (Issued 04/08/2003), titled “A Rapid and Sensitive Proximity-based Assay for the Detection and Quantification of DNA Binding Proteins,” Inventor: Tomasz Heyduk.
- 2.) U.S. Patent Application, Serial No: 10/062,064 (Filed 01/31/2002), titled “A Rapid and Sensitive Proximity-based Assay for the Detection and Quantification of DNA Binding Proteins,” Inventor: Tomasz Heyduk.
- 3.) Canada Patent Application, Nationalized PCT, Serial No: not available (Filed 08/02/2002), titled “A Rapid and Sensitive Proximity-based Assay for the Detection and Quantification of DNA Binding Proteins,” Inventor: Tomasz Heyduk.

- 4.) European Patent Application, Nationalized PCT, Serial No: 02806721.3 (Filed 03/11/2004), titled "A Rapid and Sensitive Proximity-based Assay for the Detection and Quantification of DNA Binding Proteins," Inventor: Tomasz Heyduk.
- 5.) China Patent Application, Nationalized PCT, Serial No: 02815825.3 (Filed 08/02/2002), titled "A Rapid and Sensitive Proximity-based Assay for the Detection and Quantification of DNA Binding Proteins," Inventor: Tomasz Heyduk.
- 6.) China Patent Application, Nationalized PCT, Serial No: 03803174.4 (Filing date not available), titled "A Rapid and Sensitive Assay for the Detection of Quantification of Coregulators of Nucleic Acid Binding Factors," Inventor: Tomasz Heyduk.
- 7.) Canada Patent Application, Nationalized PCT, Serial No: 2,473,708 (Filing date not available) titled "A Rapid and Sensitive Assay for the Detection of Quantification of Coregulators of Nucleic Acid Binding Factors," Inventor: Tomasz Heyduk.
- 8.) Australian Patent Application, Nationalized PCT, Serial No: 2003205320 (Filing date not available) titled "A Rapid and Sensitive Assay for the Detection of Quantification of Coregulators of Nucleic Acid Binding Factors," Inventor: Tomasz Heyduk.
- 9.) Japan Patent Application, Nationalized PCT, Serial No: 2003-564249 (Filing date not available), titled "A Rapid and Sensitive Assay for the Detection of Quantification of Coregulators of Nucleic Acid Binding Factors," Inventor: Tomasz Heyduk.
- 10.) Japan Patent Application, Nationalized PCT, Serial No: 2003-576453 (Filed 08/02/2002), titled "A Rapid and Sensitive Proximity-based Assay for the Detection and Quantification of DNA Binding Proteins," Inventor: Tomasz Heyduk.
- 11.) New Zealand Patent Application, Nationalized PCT, Serial No: 531020 (Filing date not available), titled "A Rapid and Sensitive Proximity-based Assay for the Detection and Quantification of DNA Binding Proteins," Inventor: Tomasz Heyduk.
- 12.) U.S. Provisional Patent Application, Serial No: 60/529,076 (Filed 12/12/2003), titled "Biosensors for Detecting Macromolecules and Other Analytes," Inventors: Tomasz Heyduk, Ewa Heyduk.
- 13.) PCT Patent Application, Serial No: PCT/US04/41315 (Filed 12/10/2004), titled "Biosensors for Detecting Macromolecules and Other Analytes," Inventors: Tomasz Heyduk, Ewa Heyduk.
- 14.) PCT Patent Application, Serial No: PCT/US02/24822 (Filed 08/02/2002), titled "A Rapid and Sensitive Proximity-based Assay for the Detection and Quantification of DNA Binding Proteins," Inventor: Tomasz Heyduk.
- 15.) PCT Patent Application, Serial No: PCT/US03/02157 (Filed 01/23/2003), titled "A Rapid and Sensitive Assay for the Detection and Quantification of Coregulators of Nucleic Acid Binding Factors," Inventor: Tomasz Heyduk.
- 16.) U.S. Provisional Patent Application, Serial No: Not yet assigned (Filed 6/10/05), titled "Methods for the Selection of Aptamers," Inventors: Tomasz Heyduk, Ewa Heyduk.

## **SUPPLEMENTAL INFORMATION:**

### Invited Talks and Seminars

1. Wesleyan University, Middletown, CT (1991)
2. General Meeting of American Society for Microbiology, New Orleans, LA (1992)
3. Austin Spring Meeting - "The Transcription Machine Assembly and Function" - Austin, TX(1993)
4. SPIE International Symposium - "Time-Resolved Laster Spectroscopy in Biochemistry IV" - Los Angeles, CA (1994)

5. Southern Illinois University at Carbondale (1994)
6. Wesleyan University, Middletown, CT (1994)
7. General Meeting of American Society for Microbiology, Washington, DC (1995)
8. NIH, Bethesda, MD (1995)
9. Albert Einstein College of Medicine, Bronx, NY (1995)
10. Scripps Research Institute, La Jolla, CA (1996)
11. Washington University, St. Louis, MO (1996)
12. Technical University of Wroclaw, Wroclaw, Poland (1996)
13. Southern Illinois University at Carbondale (1997)
14. Biophysical Society Meeting, New Orleans, LA (1997)
15. FASEB Summer Research Conference, Saxtons River, VT (1997)
16. Cornell University, Ithaca, NY. (1997)
17. NCI, Frederick Cancer and Development Center, Frederick, MD (1997)
18. University of Wisconsin-Madison, Madison, WI (1997)
19. Second International Assay Development for High-Throughput Screening Conference, San Diego, CA. (1998).
20. Advances in Optical Biophysics I, San Jose, CA (1998).
21. 2nd Annual Symposium on Solution Interaction of Macromolecules, Seattle, WA (1998).
22. 12<sup>th</sup> Annual Gibbs Conference on Thermodynamics (1998).
23. Sigma Chemical Co., St.Louis, MO (1999).
24. University of Goettingen, Germany (1999).
25. Oregon Health Science University, Portland, OR (2000).
26. University of Texas Medical Branch, Galveston, TX (2000).
27. 14<sup>th</sup> Annual Gibbs Conference on Thermodynamics (2000).
28. The Pennsylvania State University Medical College, Hershey, PA (2001)
29. Boston University, Boston, MA (2001).
30. Molecular Probes, Inc., Eugene, OR (2001).
31. FASEB Summer Research Conference, Saxtons River, VT (2001)
32. Biophysical Society Meeting, San Francisco, CA (2002)
33. Sigma Chemical Co., St. Louis, MO (2002)
34. Illumina, San Diego, CA (2002)
35. Rutgers University, Piscataway, NJ (2002)
36. Parnas Conference, Wroclaw, Poland (2002)
37. Loyola University, Chicago, IL (2002)
38. Louisiana State University, Baton Rouge, LA (2003)
39. Ohio State University, Columbus, OH (2003)
40. Biophotonics Meeting, San Antonio, TX (2003)
41. University of Delaware, Newark, DE (2003)
42. University of Wisconsin, Madison (2003)
43. St. Louis University, Dep. Of Chemistry (2003)
44. St. Louis University, Dep. Of Microbiology and Molecular Immunology (2004)

45. <sup>9th</sup> FEBS Congress, Warsaw, Poland (2004)
46. University of Indiana, Bloomington, IN (2005)
47. NCI, Bethesda, MD (2005)
48. Washington University, St. Louis, MO (2006)
49. University of Indiana Medical School, Evansville, IN (2006)